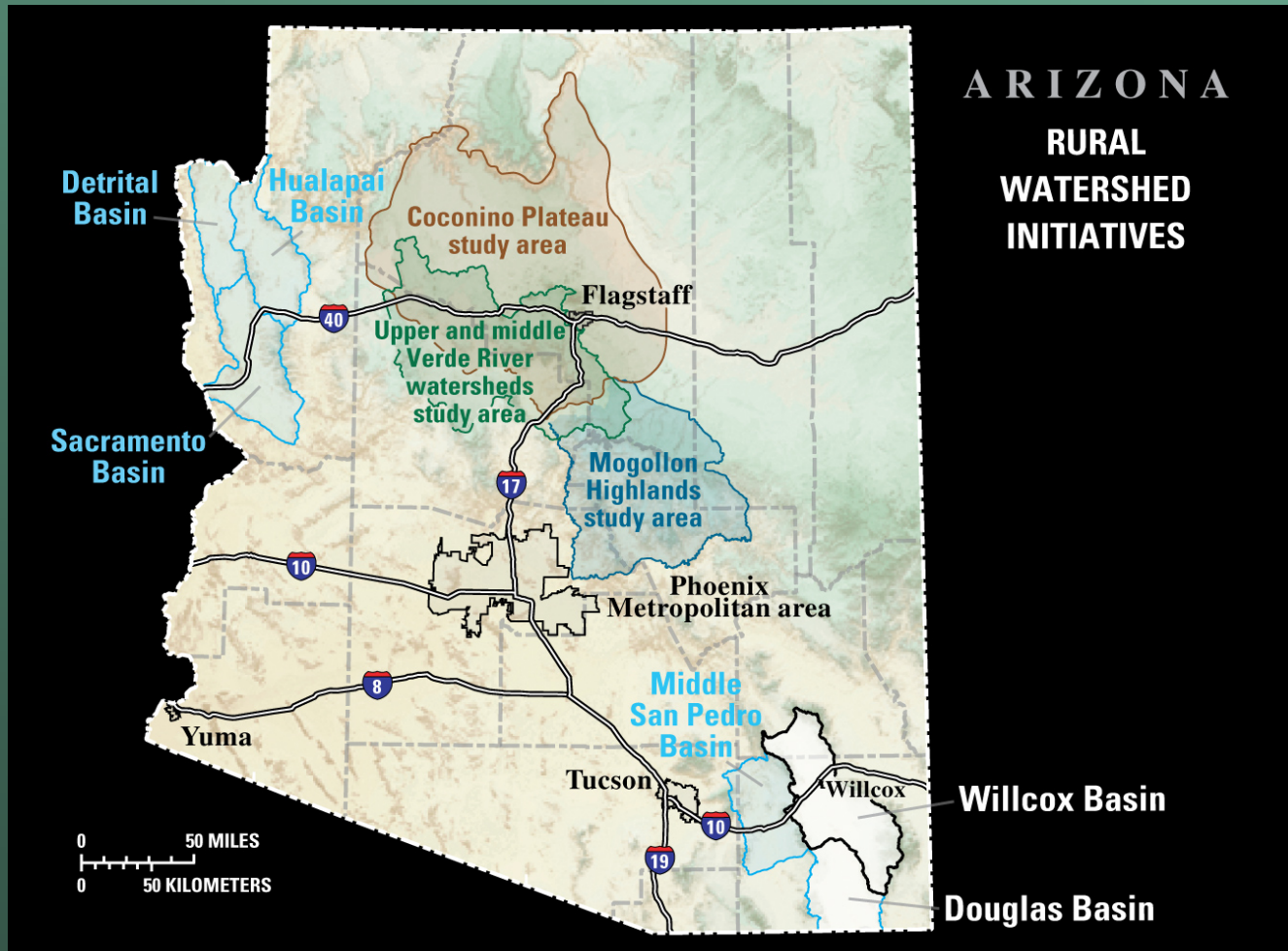


Hydrogeology of the Mogollon Highlands, central Arizona

John Parker
USGS



ARIZONA RURAL WATERSHED INITIATIVES

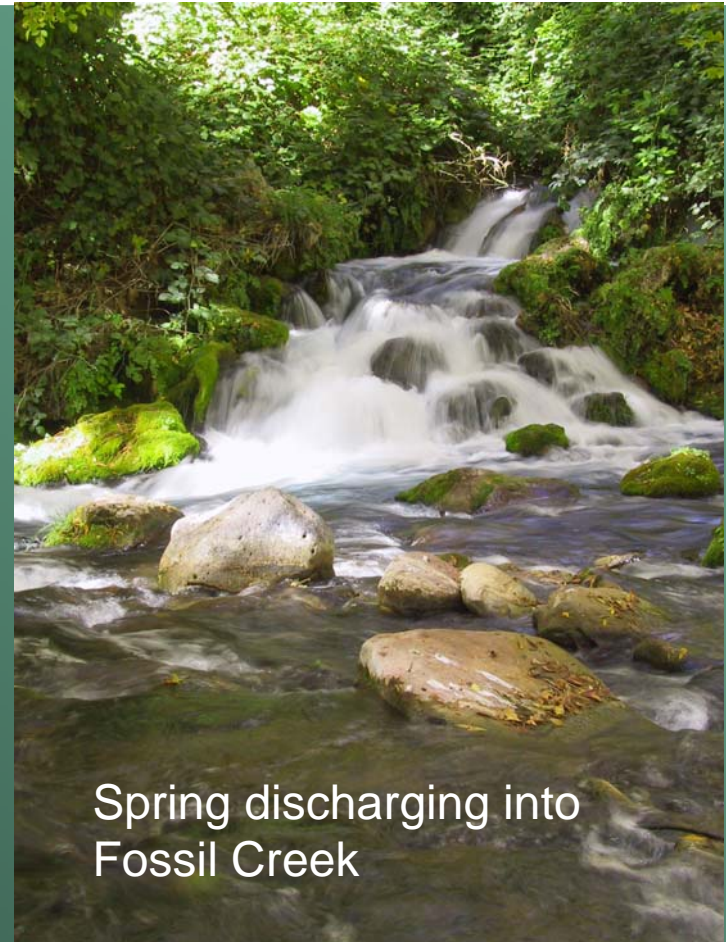


Hydrogeologic Framework Study

- Understand relations between geologic controls and hydrologic system.
- Interactions between climate, topography, water use, and surface- and ground-water systems.
- Synthesize findings into conceptual model.

Study area characteristics

- **Mogollon Rim:** escarpment forming southern edge of Colorado Plateau
- **Two regional aquifers:** fractured bedrock systems. Supply base flow to perennial streams
- **Locally recharged aquifers.** Main water supply for residents.



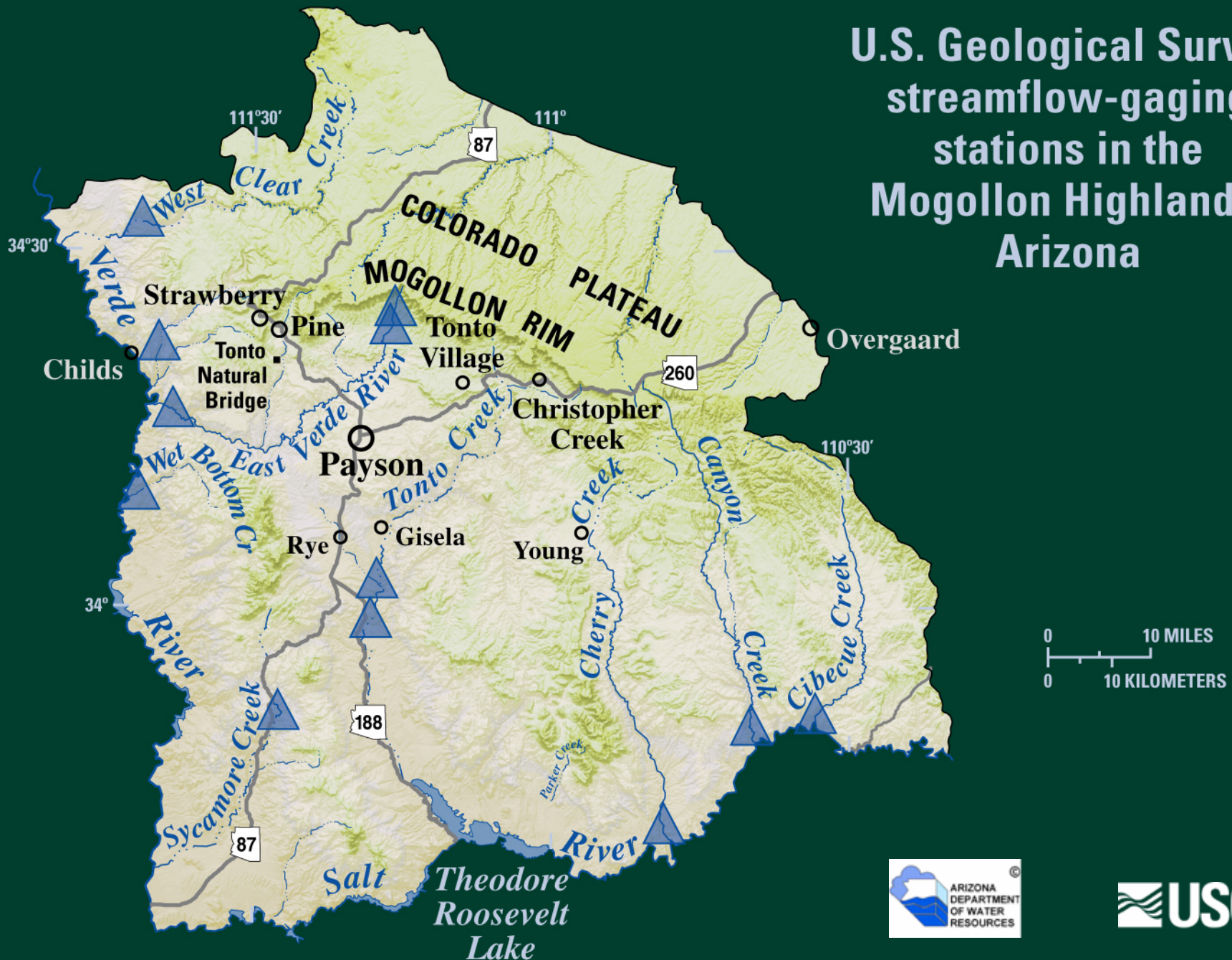
Spring discharging into
Fossil Creek

Water issues in Mogollon Highlands

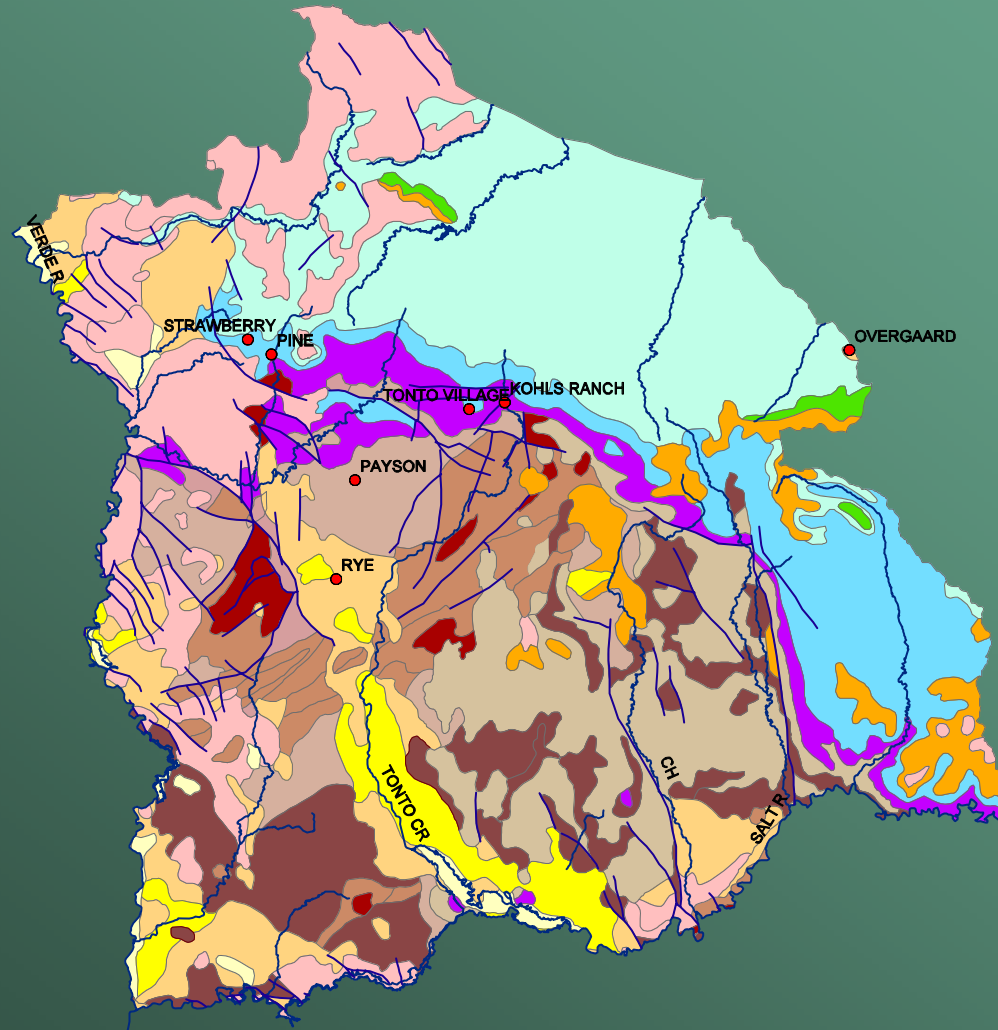
- Increasing population, tourism.
- Competing water uses.
- Limited access to water resources.



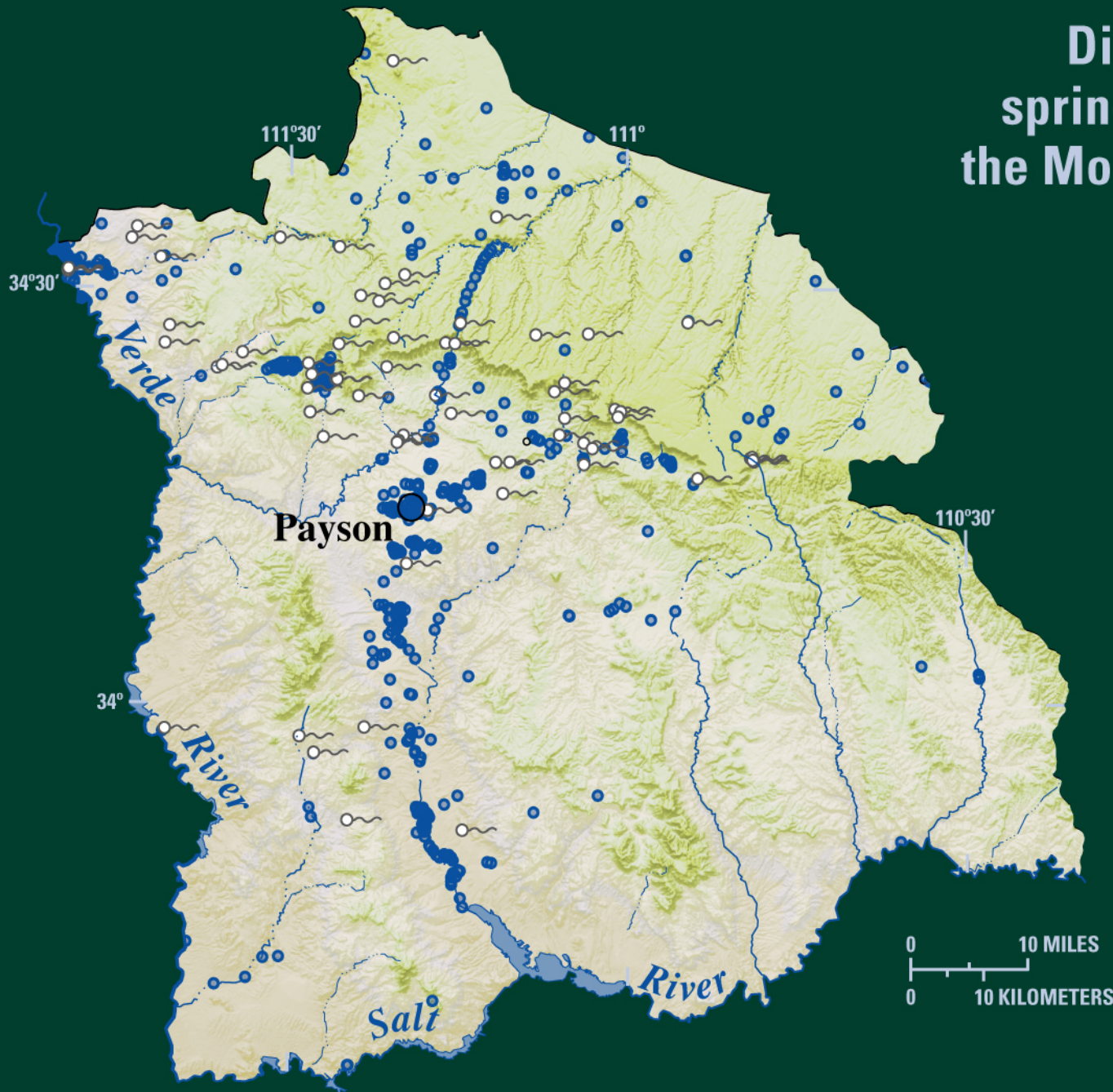
U.S. Geological Survey streamflow-gaging stations in the Mogollon Highlands, Arizona



Geology of Mogollon Highlands



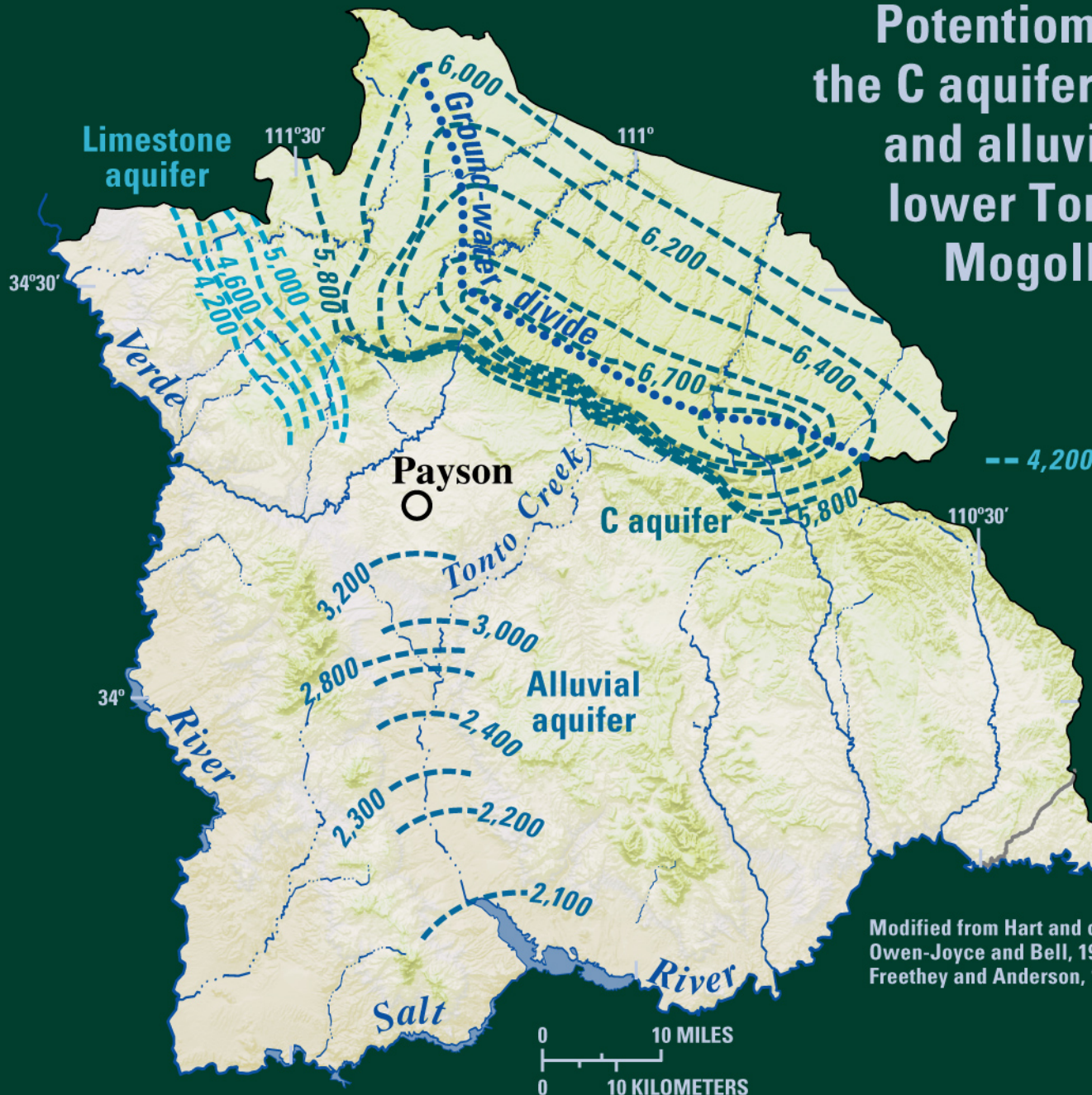
Distribution of springs and wells in the Mogollon Highlands



EXPLANATION

-  SPRING
-  WELL

Potentiometric surfaces of the C aquifer, limestone aquifer, and alluvial aquifer in the lower Tonto Creek Basin, Mogollon Highlands



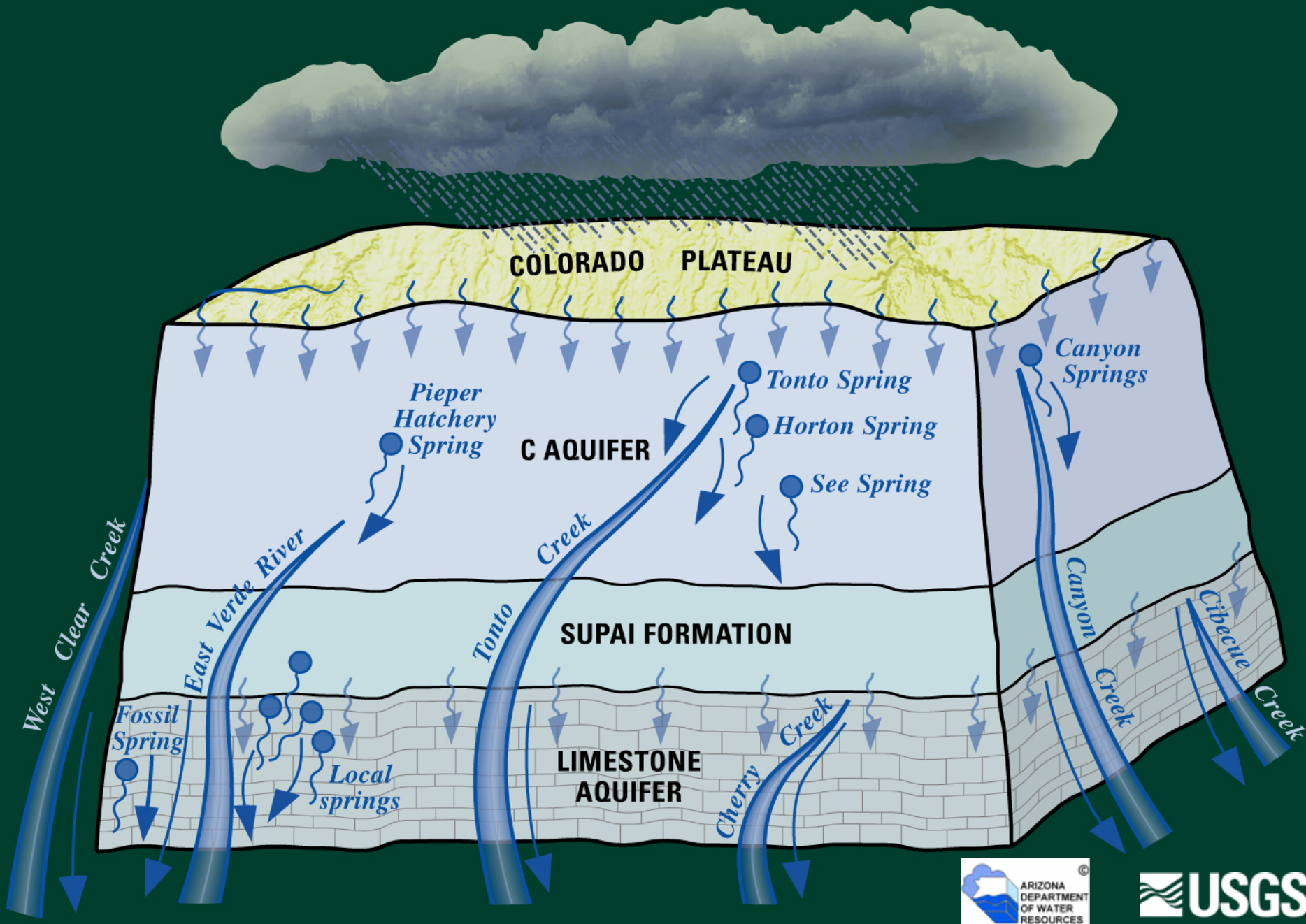
EXPLANATION

-- 4,200 -- POTENTIOMETRIC CONTOUR—
Shows altitude at which water level would stand in a tightly cased well on the basis of average values to 2002. Contour interval 100 and 200 feet. Datum is NGVD of 1929

Modified from Hart and others, 2002;
Owen-Joyce and Bell, 1983; and
Freethy and Anderson, 1986



Diagram of the ground-water system in the Mogollon Highlands



Mogollon Highlands Ground-water Budget (Average Annual Acre-feet/year)

C AQUIFER

INFLOW :

Recharge 56,200

OUTFLOW:

Base flow 24,100

Leakage
to limestone
aquifer 32,100

TOTAL 0

LIMESTONE AQUIFER

INFLOW :

Recharge 46,800

C aquifer

leakage 32,100

OUTFLOW:

Base flow 79,900

TOTAL -1,000

Significant Findings

- Little response of C and limestone aquifers to short-term climatic fluctuations and water use.
- Limestone aquifer connected to C aquifer.
- Little or no connection between regional aquifers and local water-bearing zones in Pine and Strawberry area and in Payson.